IS 5578 (1984): Guide for marking of insulated conductors
[ETD 1: Basic Electrotechnical Standards]

BLANK PAGE

IS : 5578 - 1984
(Reaffirmed 1996)

Indian Standard

GUIDE FOR MARKING OF INSULATED CONDUCTORS

(First Revision)

Third Reprint APRIL 2001

UDC 621.315.3 : 621.777 (026)

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4 *December* 1985

AMENDMENT NO. 1 OCTOBER 1996
TO
IS 5578 : 1984 GUIDE FOR MARKING OF INSULATED CONDUCTORS

(First Revision)

(*Page* 3, *clause* **0.4**, *line* 4) Substitute 'IS 11353 . 1985 Guide for uniform system of marking and identification of conductors and apparatus terminals' *for* 'IS : 375 - 1963*' and delete foot-note with '*' mark.

(*Pages* 3 *and* 4, *clause* **0.5**) — Substitute the following for the existing clause:

"**0.5** In order to cover guidelines on the uniform system of terminal marking, IS 11353 - 1985 'Guide for uniform system of marking and identification of conductors and apparatus terminals' should be referred to in addition to those given in this standard."

(*Page* 4, *foot-note marked* '*') Delete

Printed at Dee Kay Printers, New Delhi

Indian Standard

GUIDE FOR MARKING OF INSULATED CONDUCTORS

(First Revision)

Low Voltage Switchgear and Controlgear Sectional Committee, ETDC 57

Chairman	*Representing*
SHRI V. S. BHATIA	Siemens India Ltd, Bombay
Members	
SHRI S. G. NENE (*Alternate* to Shri V. S. Bhatia)	
SHRI C. R. BALASUBRAMANIAN	English Electric Co of India Ltd, Madras
SHRI M. SESHADRI (*Alternate*)	
SHRI S. N. BISWAS	Crompton Greaves Ltd, Bombay
SHRI B. G. KARAJGIKAR (*Alternate*)	
SHRI K. K. BERRY	Central Small Scale LT Switchgear Manufacturers Association, New Delhi
SHRI SETHI (*Alternate*)	
CHIEF ENGINEER (ELEC) II	Central Public Works Department, New Delhi
SURVEYOR OF WORKS (ELEC) II (*Alternate*)	
CHIEF ENGINEER	Rural Electrification Corporation Ltd, New Delhi
SHRI S. C. KHURANA (*Alternate*)	
SHRI V. C. DOSHI	Associated Cement Companies Ltd, Bombay
SHRI R. H. KULKARNI (*Alternate*)	
DIRECTOR (DISTRIBUTION)	Central Electricity Authority, New Delhi
DEPUTY DIRECTOR (UNION TERRITORIES DIRECTORATE) (*Alternate*)	
DIRECTOR	Central Power Research Institute, Bangalore
JOINT DIRECTOR, SWITCHGEAR & TESTING DEVELOPMENT STATION (*Alternate* I)	
DEPUTY DIRECTOR (*Alternate* II)	
SHRI A. N. DUTT	Electrical Contractors Association of Eastern India, Calcutta
SHRI ABANI DUTTA (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI K. L. GARG	Directorate General of Supplies and Disposals, New Delhi
SHRI R. V. NARAYANAN (*Alternate*)	
SHRI L. GOPALAKRISHNAN	Directorate General of Technical Development, New Delhi
SHRI I. C. JOSEPH	In personal capacity
SHRI M. A. JOSHI	Bharata Cutler Hammer Ltd, Faridabad
SHRI V. J. KANITKAR (*Alternate*)	
SHRI KAUSHAL DEV	Haryana State Electricity Board, Chandigarh
SHRI R. C. KHANNA	Delhi Electric Supply Undertaking, New Delhi
SHRI Y. P. CHADHA (*Alternate*)	
SHRI B. H. KHANDERIA	Tata Consulting Engineers, Bombay
SHRI U. G. KAMATH (*Alternate*)	
SHRI B. S. KOTHARI	The Bombay Electric Supply and Transport Undertaking, Bombay
SHRI A. A. KHANOLKAR (*Alternate*)	
SHRI K. C. LAHIRI	Bharat Heavy Electricals Ltd, Hyderabad
SHRI R. SUBBA RAO (*Alternate* I)	
SHRI S. SURI (*Alternate* II)	
SHRI V. P. MAHENDRU	Northern India Switchgear Manufacturers Association, Jalandhar
SHRI J. K. GUPTA (*Alternate*)	
SHRI J. K. MEHTA	The Ahmedabad Millowners' Association, Ahmadabad
SHRI R. M. THAKKER (*Alternate*)	
SHRI J. S. NEGI	Jyoti Ltd, Vadodara
SHRI V. B. DESAI (*Alternate*)	
SHRI H. M. PAI	The Ahmedabad Electricity Co Ltd, Ahmadabad
SHRI M. B. BAHULKAR (*Alternate*)	
DR G. M. PHADKE	Indian Electrical Manufacturers' Association, Bombay
SHRI A. SATISAN (*Alternate*)	
SHRI T. RAMANKUTTY	Tamil Nadu Electricity Board, Madras
SHRI K. SRINIVASAN (*Alternate*)	
SHRI R. P. SRIVASTAVA	Railway Board, New Delhi
SHRI R. SRINIVASAN (*Alternate*)	
SHRI U. S. VERMA	National Test House, Calcutta
SHRI D. P. MUKHERJEE (*Alternate*)	
SHRI M. P. WAGH	Larsen & Toubro Ltd, Bombay
SHRI V. N. DRAVID (*Alternate*)	
SHRI S. P. SACHDEV, Director (Elec tech)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI K. GANESH
Deputy Director (Elec tech), ISI

Indian Standard

GUIDE FOR MARKING OF INSULATED CONDUCTORS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 19 April 1984, after the draft finalized by the Low Voltage Switchgear and Controlgear Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 The object of this standard is to define the systems of identification marking to use for insulated conductors. It distinguishes two types of markings:

a) Main markings, and

b) Supplementary markings.

The purpose of marking insulated conductors is to provide, if necessary, a means whereby condcutors can be identified in the circuit and also after they have been detached from the terminals to which they were connected.

0.3 This standard is intended to cover only the marking of the conductors for the purposes of identification and does not cover the terminal markings on the equipment itself to which the conductor is connected.

0.4 One of the major applications of this guide is in the field of switchgear and controlgear installations, where conductor marking is resorted to for identification of auxiliary wiring in factory built assemblies. Guidelines on the same are covered in IS : 375-1963*. However, in order to provide general guidelines on all possible cases of marking and to take into view the developments at the international level, the present revision is brought out.

0.5 Attention is drawn to the contents of Indian Standard under preparation which covers guidlines on the uniform system of terminal marking of equipment using alphanumeric notation and identification of conductors

*Marking and arrangements for switchgear busbars, main connections and auxiliary wiring (*revised*).

using colours. This, together with the guidelines contained herein replace IS : 375-1963*.

0.6 In the preparation of this standard, considerable assistance had been derived from IEC Publication 391 (1972) ' Marking of Insulated Conductors ' issued by the International Electrotechnical Commission.

0.7 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expresing the result of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard applies to the marking of insulated conductors used in industrial installations and the equipment which forms part of them, except insulated conductors constituting the terminals of electrical apparatus (for example, rotating machines or transformers).

1.2 It applies only to other installations and equipment (for example, telecommunication circuits or circuits including telecommunication equipment) when reference is made to them.

2. TERMINOLOGY

2.0 For the purposes of this standard, the definitions given below shall apply.

2.1 Terminal — A conducting element of a piece of apparatus, designed for connecting it to external circuits.

2.2 Terminal Board — A board or block or strip carrying several terminals insulated from each other and usually from earth.

2.3 Identification Mark — A mark which identifies a conductor or a group of conductors at each end and, when necessary, at visible points throughout its length.

2.4 Systems of Marking

2.4.1 *Main Marking* — A system of marking characterizing each conductor or group of conductors irrespective of their electrical function.

*Marking and arrangements for switchgear busbars, main connections and auxiliary wiring (*revised*).

†Rules for rounding off numerical values (*revised*).

a) *Dependent marking* — A system of marking conductors, or group of conductors based on the markings of the terminals at which the conductors terminate or of the equipment to which the groups of conductors are connected.

1) *Dependent local-end marking*

i) *Of a conductor* — A system of marking in which the marking of a conductor end is the same as that of the terminal to which it is connected.

ii) *Of a group of conductors* — A system of marking in which the marking of a group of conductor ends indicates the part of equipment to which it is connected.

2) *Dependent remote-end marking*

i) *Of a conductor* — A system of marking in which the marking of a conductor end is the same as that of the terminal to which its remote end is connected.

ii) *Of a group of conductors* — A system of marking in which the marking of a group of conductor ends indicates the part of equipment to which its remote end is connected.

3) *Dependent both-end marking*

i) *Of conductor* — A system of marking in which each end of a conductor is marked both with the marking of the terminal to which it is connected and also with that of the terminal to which its remote end is connected.

ii) *Of a group of conductors* — A system of marking in which each end of a group of conductors is marked to indicate both the part of equipment to which it is connected and also the part of equipment to which its remote end is connected.

b) *Independent marking* — A system of marking of conductors or group of conductors, independent of the marking of the terminals at which the conductors terminate or of the equipment to which the group of conductors are connected.

c) *Composite marking* — A system of marking in which dependent marking and independent marking are used together.

2.4.2 *Supplementary Marking* — A system of marking generally used as a supplement to the main marking and based on the electrical function of each conductor or group of conductors.

a) *Functional mark* — A supplementary mark indicating:

i) either the function of each conductor considered individually (examples: switching on or off, signalling a position, meaurement of a current or a voltage); and

ii) or the function of several conductors considered together (examples: heating, lighting, signalling, measuring circuits).

b) *Phase mark* — A supplementary mark showing to which phase of an ac system of conductor is connected.

c) *Polarity mark* — A supplementary mark showing to which pole of a dc circuit a conductor is connected.

3. GENERAL RULES

3.1 The identification marks shall be placed at the ends of conductors and, where necessary, at visible points along their length.

3.2 The main markings shall be of one of the types defined in **2.4.1.**

3.3 Conductors may carry supplementary marks as defined in **2.4.2.** In some cases, these supplementary markings may be sufficient and there may be no need for main marking.

4. APPLICATION OF THE SYSTEMS OF MAIN MARKINGS

4.1 Dependent Marking — In dependent marking [*see* **2.4.1**(a)] conductor marks may include (Fig. 2 and 4) or may not include (Fig. 1 and 3) equipment marks; however, conductor marks shall always include equipment marks when the use of terminal marks alone would be confusing (Fig. 2).

4.1.1 *Dependent Both-End Marking* [*see* **2.4.1**(a)(3)] — This system illustrated in Fig. 1 and 2 permits the conductor to be connected to its local-end terminal without having to refer to a diagram or a connection table and indicates also its remote-end terminal, thus facilitating fault location and maintenance work.

NOTE — For the order of inscription of marks, *see* **7.**

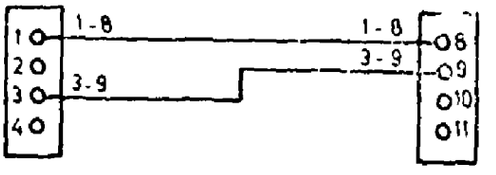


FIG. 1 EXAMPLE OF DEPENDENT BOTH-END MARKING FOR TWO CONDUCTORS

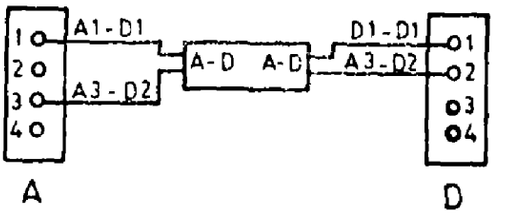


FIG. 2 EXAMPLE OF DEPENDENT BOTH-END MARKING FOR TWO CONDUCTORS AND FOR A GROUP OF CONDUCTORS (CABLE)

4.1.2 *Dependent Local-End Marking* [*see* **2.4.1**(a)(1)] — This system, illustrated in Fig. 3, is simpler than the system in **4.1.1**, but a diagram or a connection table may be necessary when faults have to be located or maintenance work done, if the actual run of the conductor is not immediately apparent.

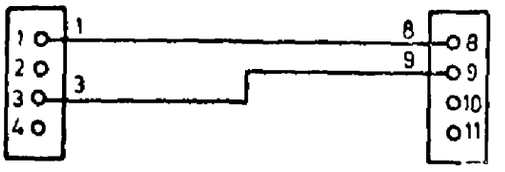


FIG. 3 EXAMPLE OF DEPENDENT LOCAL-END MARKING FOR TWO CONDUCTORS

4.1.3 *Dependent Remote-End Marking* [*see* **2.4.1**(a)(2)] — This system, of which Fig. 4 gives an example, is also simpler than both-end marking and is convenient for fault location and maintenance work, but it usually necessitates a diagram or a connection table to enable any connection which may have been removed to be replaced correctly.

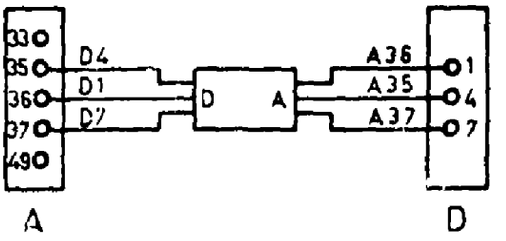


FIG. 4 EXAMPLE OF DEPENDENT REMOTE-END MARKING FOR THREE CONDUCTORS AND FOR A GROUP OF CONDUCTORS (CABLE)

4.2 Independent Marking — In independent marking [*see* **2.4.1**(b)]; the same marking, usually of a simple form, is used all along the conductor, even if it has junctions in its run. Except in certain simple cases, a connection diagram or table should be used to make it clear to which terminal each conductor end should be connected (*see* Fig. 5).

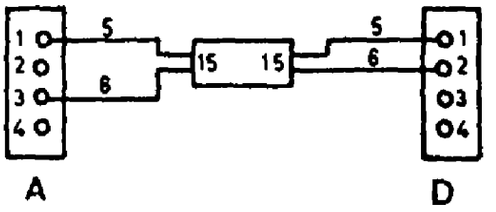


FIG. 5 EXAMPLE OF INDEPENDENT MARKING FOR TWO CONDUCTORS AND FOR A GROUP OF CONDUCTORS (CABLE)

The connection table, if made use of, should indicate:

conductor 5 connects A1 to D1, and

conductor 6 connects A3 to D2.

NOTE — The decision to make use of a diagram or connection table is to be left to the user.

When a functional mark is a complete means of identification, it may be used as an independent marking without adding other markings (*see* **3.3** and Fig. 6).

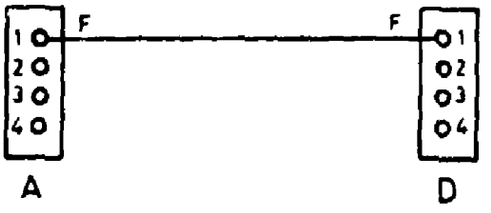


FIG. 6 EXAMPLE OF FUNCTIONAL MARKING

4.3 Composite Marking — Composite marking [*see* **2.4.1**(c)] offers the advantages of dependent marking and permits a simplification of any intermediate marking that may be required along the conductor (*see* Fig. 7, 8 and 9).

If dependent marking is not complete, and does not make use of both ends, a diagram or connection table may be necessary.

The connection table, if made use of, should indicate:

conductor 5 connects A1 to D1, and
conductor 6 connects A3 to D2.

The connection table, if made use of, should indicate:

conductor group (cable) 15 connects terminal boards A and D.

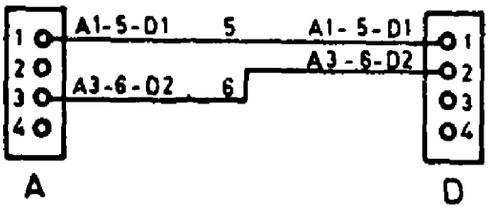


FIG. 7 EXAMPLE OF COMPOSITE MARKING FOR TWO CONDUCTORS

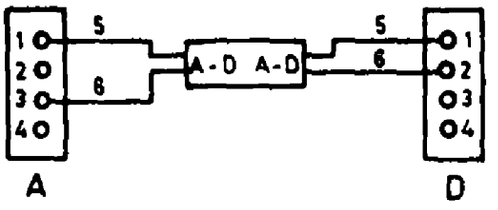


FIG. 8 EXAMPLE OF COMPOSITE MARKING: INDEPENDENT FOR THE CONDUCTORS; DEPENDENT BOTH-END FOR THE CONDUCTOR GROUP (CABLE)

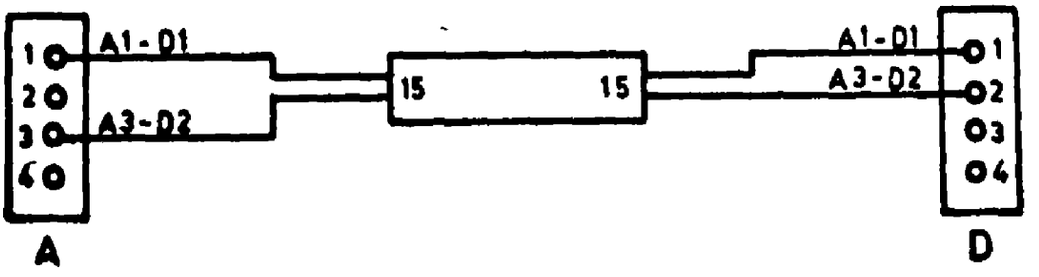


FIG. 9 EXAMPLE OF COMPOSITE MARKING: DEPENDENT BOTH-END MARKING FOR THE CONDUCTORS; INDEPENDENT FOR THE CONDUCTOR GROUP (CABLE)

5. SUPPLEMENTARY MARKS

5.0 Supplementary marks (*see* **2.4.2**) may be letters or figures, like the main marks. Colour marks or appropriate symbols may also be used. In some cases, to avoid confusion, it is preferable to separate the supplementary marks from the main marks by punctuation signs [for example, an oblique stroke (/)].

5.1 Functional Marks — If functional marks [*see* **2.4.2**(a)] are used, they should be in agreement either with a table which gives their meaning.

5.2 Phase Marks — Where phase marks [*see* **2.4.2**(b)] are used, the hour (clock face) number system should be applied, if possible, as described in IS : 11354-1985*. Where that system is not applicable, capital letters or figures, or both, should be used in phase sequence order.

The neutral conductor of an ac system should be indicated by the letter 'N'.

NOTE — If confusion is possible, the hour numbers or other figures or letters, used to indicate the phase, should be placed between oblique strokes (for example: /8/).

5.3 Polarity Marks — Where symbols are used to indicate the polarity of a conductor of a direct current circuit [*see* **2.4.2**(c)], the following marks should be used:

\+ for the positive pole;

– for the negative pole;

M for the mid-wire for dc system.

NOTE — If there is a risk of confusion between a hyphen and the mark for the negative pole, the latter should be indicated by a hyphen in parentheses (-).

5.4 Protection and/or Earthing Marks — *See* IS : 11353-1985†.

6. ARRANGEMENT OF MARKS

6.1 If a mark includes various elements, each of these should be distinguished from the others, for example:

a) by an interval, or an appropriate sign, for example a hyphen;

b) by the use of different typographic characters; and

c) by arrangement in columns (*see* **6.2**).

*Guide for identification by hour numbers of the phase conductors of 3-phase electrical systems.

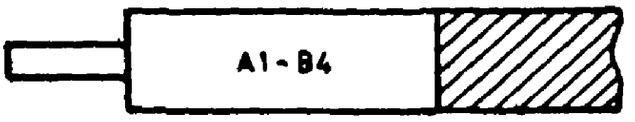
†Guide for uniform system of marking and identification of conductors and apparatus terminals.

6.2 The different elements constituting a mark should be either:

a) along the axis of conductor (longitudinal marking); or

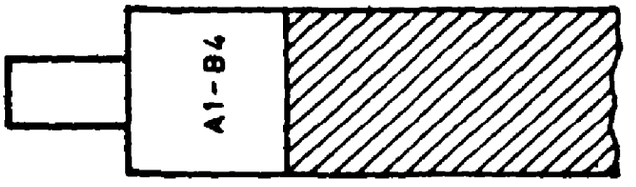
b) across the axis of the conductor (transverse marking).

In all cases, the characters should be so placed as to facilitate reading. They may be arranged in a column or in a row (*see* Fig. 10), and shall then be read from top to bottom and from left to right.

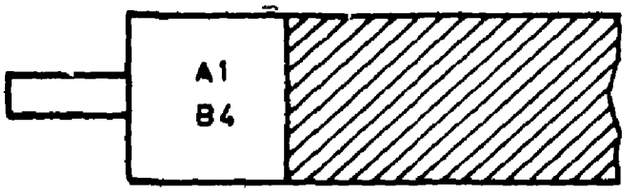


Longitudinal Marking in a Row

Longitudinal Marking in a Column



Transverse Marking in a Row



Transverse Marking in a Column

FIG. 10 EXAMPLES OF ARRANGEMENTS OF MARKS ON CONDUCTORS OR CONDUCTOR GROUPS (CABLES)

7. RELATIVE POSITIONS OF MARKS

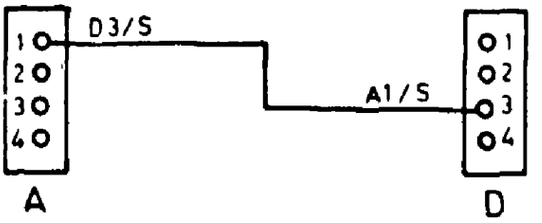
7.1 Dependent Marking

7.1.1 In the case of dependent marking (local-end or remote-end), the order in which the marks should be written is as follows:

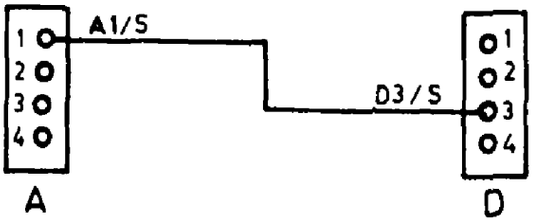
Corresponding terminal mark; and

If necessary, the supplementary marks (*see* **5**).

Figure 11 gives examples:



a) Remote-end Marking



b) Local-end Marking

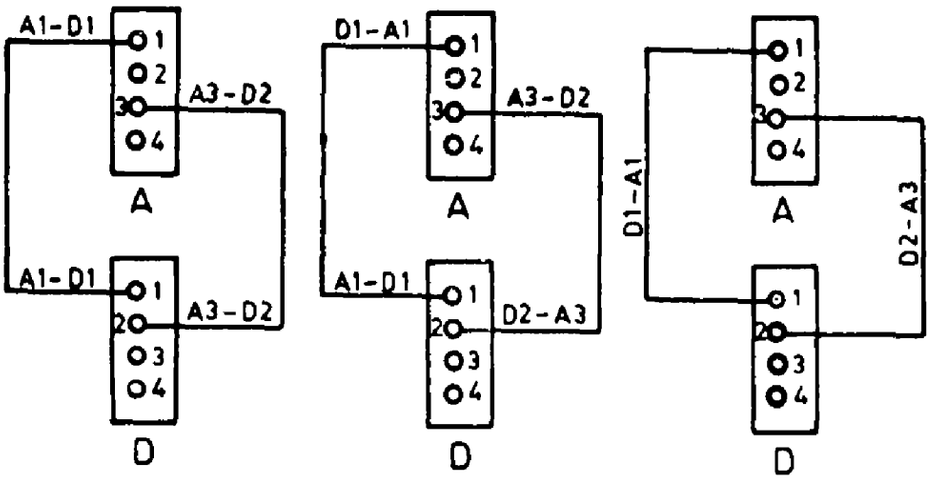
FIG. 11 EXAMPLES OF DEPENDENT MARKING WITH SUPPLEMENTARY MARKS

7.1.2 In the case of dependent both-end marking, of which Fig. 12 gives three examples, the order is as follows:

a) The mark of one of the two terminals;

b) If necessary, the supplementary marks (*see* **5**); and

c) The mark of the other terminal.



Example A : Identical Marks on Both Ends | Example B : Different Marks on Each End | Example C : Intermediate Mark Only

FIG. 12 EXAMPLES OF THE ORDER OF MARKING IN THE DEPENDENT BOTH-END MARKING

7.2 Independent Marking — In the case of independent marking, the order is as follows:

Identification mark of the conductor; and

If necessary, the supplementary marks (*see* **5**).

Figure 13 gives an example:

16 — identification mark of the conductor, and
S — supplementary mark.

FIG. 13 INDEPENDENT MARKING

7.3 Composite Marking — In the case of composite marking of a conductor, the order is as follows:

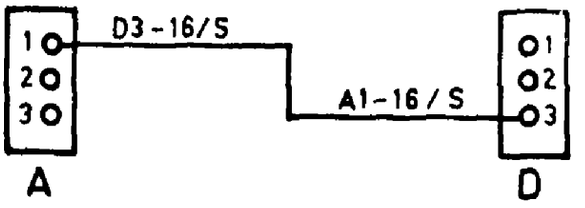
a) Mark of one terminal;

b) Independent mark of the conductor;

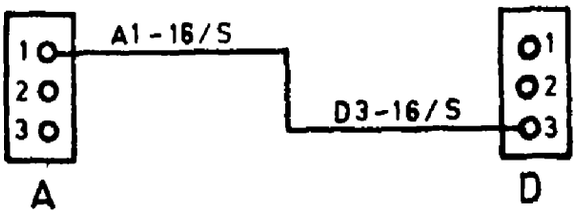
c) If necessary, the supplementary marks (*see* **5**); and

d) Finally, the mark of the other terminal (in the case of dependent both-end marking).

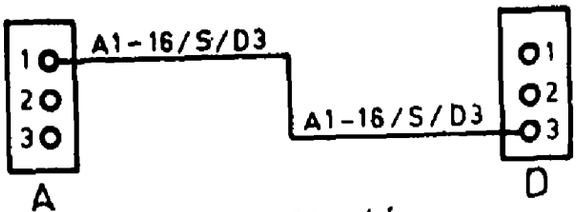
Figure 14 gives four examples:



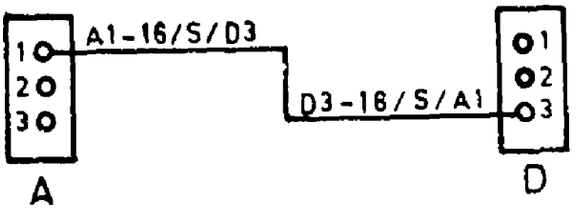
a) Remote-end Marking



b) Local-end Marking



c) Both-end Marking
(identical marks on both ends)



d) Both-end Marking
(different marks on each end)

16 — identification mark of the conductor, and
S — supplementary mark

FIG. 14 EXAMPLES OF COMPOSITE MARKING

NOTE — In some cases it may be appropriate to add additional significance to the order of symbols. For example, in the dependent both-end marking, it may be agreed that the marking of the local end terminal is placed next to the conductor end (*see* Fig. 12, Example B).

8. CHARACTERS TO BE USED

8.1 Marks should be written as far as possible in Roman capitals and in Arabic numerals or in standardized graphical symbols.

In the case of dependent marking, however, the marks should be written as far as possible in the same characters as are used for the terminal markings.

9. INSCRIPTION ON DIAGRAMS OF MARKS CARRIED BY CONDUCTORS (OR GROUP OF CONDUCTORS)

9.1 To indicate on a diagram the mark carried by a conductor, the mark should be inscribed close to the conductor symbol, as shown in the preceding figures.

9.2 Where dependent both-end marking is used, the sequence of the terminal markingsof which the conductor markings is made up shall be the same on the diagram as on the conductor, at both ends.

9.3 Supplementary marks, according to their function, may be written:

on the diagram only,

on certain conductors only or on all of them, and

on both the diagram and the conductors.

BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones 323 0131, 323 3375, 323 9402 Fax +91 011 3234062, 3239399, 3239382
E - mail bis@vsnl com **Internet** http //wwwdel vsnl net in/bis org

Central Laboratory	***Telephone***
Plot No 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	477 00 32
Regional Offices:	
Central Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern 1/14 CIT Scheme VII, V I P Road, Kankurgachi, CALCUTTA 700054	337 86 62
Northern SCO 335-336, Sector 34 A, CHANDIGARH 160022	60 38 43
Southern C I T Campus, IV Cross Road CHENNAI 600113	235 23 15
†Western Manakalaya, E9, MIDC, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices:	
Pushpak , Nurmohamed Shaikh Marg Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore Tumkur Road, BANGALORE 560058	839 49 55
Commercial-cum-Office Complex, Opp Dushera Maidan, E-5 Arera Colony, Bittan Market, BHOPAL 462016	72 34 52
62/63, Ganga Nagar, Unit VI, BHUBANESWAR 751001	40 36 27
5th Floor, Kovai Towers, 44 Bala Sundaram Road, COIMBATORE 641018	21 88 35
Plot No 58, Neelam Bata Road, NIT, FARIDABAD 121001	42 82 60
Savitri Complex, 116 G T Road, GHAZIABAD 201001	471 19 98
53/5 Ward No 29, R G Barua Road, 5th By-lane, Apurba Sinha Path, GUWAHATI 781003	54 11 37
5-8-56C, L N Gupta Marg, Nampally Station Road, HYDERABAD 500001	320 10 84
E 52, Chitranjan Marg, C Scheme, JAIPUR 302001	37 38 79
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	21 89 23
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 28 08
First Floor, Plot Nos 657-660, Market Yard, Gultekdi, PUNE 411037	426 86 59
'Sahajanand House' 3rd Floor, Bhaktinagar Circle, 80 Feet Road, RAJKOT 360002	37 82 51
T C No 14/1421, University P O Palayam, THIRUVANANTHAPURAM 695034	32 21 04

---

*Sales Office is at 5 Chowringhee Approach, P O Princep Street, CALCUTTA 700072	237 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Printed at Dee Kay Printers New Delhi